

# The CAPITOL HILL MONITOR

DECEMBER 1994

## TIPS FOR MORE EFFECTIVE CELLULAR MONITORING

by Alan Henney

In October of 1986, Congress amended Title 18 of the U.S. Code to make monitoring of cellular telephone conversations a federal crime. Then-President Ronald Reagan signed the proposal, known as the Electronic Communications Privacy Act (ECPA), into law in spite of objections from scanner enthusiasts and others who fought vigorously against it.

The responsibility for ensuring communications privacy, for the first time, became the burden of the receiver instead of the sender. "The Electronic Communications Privacy Act of 1986 and a subsequent law that bans the sale of scanning receivers that tune cellular telephone frequencies are bad laws," writes Don Bishop, editorial director of Mobile Radio Technology, a trade journal for the mobile communications industry. "Privacy," Bishop states, "should be obtained by scrambling the transmission, not by outlawing receiving equipment and its use."

Even though cellular telephones continue to transmit a frequency modulated signal, much like other broadcast or two-way radio systems, the cellular industry insists that cellular telephones deserve the same level of privacy as land-line telephones.

"The cellular industry," states a Cellular Telecommunications Industry Association (CTIA) press release, "is wholeheartedly committed to the personal privacy of cellular telephone users. Cellular was never meant to be a 'broadcast-type' service, like CB radios, but rather, wireless telephony. The same expectation of privacy enjoyed by all Americans on the traditional wired phone network should apply to cellular," CTIA claims.

During the Surveillance Expo '94, held in McLean, American Technology Associates and Ross Engineering demonstrated how legally obtained equipment can accomplish what lobbyists, legislators and FCC regulation-writers tried to prevent: reception of cellular telephone frequencies.

Three legal types of equipment were used to monitor transmissions on cellular frequencies, says the September Mobile Radio Technology. One of the demonstrations used a cellular telephone as a scanner. "It isn't possible to ban cellular without putting the cellular companies and their lobbyists out of business. The law restricting reception on cellular frequencies is on the books," states MRT's Bishop, "but it should be rescinded."

"The bottom line is simple," says Monitoring Times' Bob Grove. "The FCC should require the cellular providers to abide by the same privacy guidelines which they require of other licensees, and rescind the repressive and unworkable anti-cellular regulations."

## TECHNIQUES FOR RECEIVING CELLULAR

In order to monitor cellular calls, scanner listeners must first obtain an appropriate receiver -- a task which, because of the ECPA and digital technology, is increasingly more complicated. In April it became illegal to manufacture, sell or import any scanner which is capable of receiving cellular frequencies; readily altered to receive cellular frequencies; or which can convert digital cellular signals to analog. Such cellular-capable scanners, however, are still legal to sell and own.

Cellular companies are pushing digital cellular phones for customers who want something more secure than a standard analog phone. The cellular industry, however, has assured customers that analog phones will be supported into the next century. Analog scanners with cellular coverage, as a result, will continue to be popular with scanner enthusiasts. Some cellular companies, such as Bell Atlantic, plan to, or already, offer scrambling systems that make calls harder to intercept than a digital-only cellular phone.

In spite of the law banning cellular-modifiable scanners, cellular listening, even on new 800 MHz scanners, is often easily accomplished. For starters, numerous cellular restoration modifications exist for older 800 MHz scanners and for some newer models as well. The



Frequency Forum computer BBS and the scanner modification handbooks offer numerous modifications.

If a modification is not possible, images related to the scanner's intermediate frequency may come in handy. As scanner listeners discovered long ago, many scanners are prone to receiving "images," which now can be used to the listener's benefit. Not only can a scanner receive a frequency on the frequency it is transmitted on, but on many scanners, the frequency can also be received two-times-the-intermediate-frequency (IF) higher. Images, which are artifacts of the original frequency, normally occur in multiples of a receiver's intermediate frequencies.

For example, even though the cellular band may be missing from a scanner, the images of the cellular band will often be receivable two-times-the-IF higher. Check the specifications for your scanner. One of the most common intermediate frequencies is 10.7 MHz. Multiply the IF by two and add the sum to the frequency you want to hear. On a scanner which has an IF of 10.7 MHz, for example, the cellular band (869.04 to 893.97) will likely be receivable at 890.44 to 915.37. The 890.44 to 893.97 range still lies within the cellular band, so this 3.53 MHz portion will still be inaccessible in cellular-blocked scanners.

Even on two of Radio Shack's newest scanners, which are manufactured by Uniden and comply with the latest regulations, the cellular range is still accessible! Cellular frequencies in Realistic's Pro-23 and Pro-51 scanners are blocked at the factory, but according to the July Monitoring Times, the frequencies are easily accessed through a short keyboard routine. Here's how:

1. With the radio switched off, hold down the 2, 9, and LOCK-OUT keys; turn the radio on and release the keys.
2. Step to channel 15 on the Pro-23 or to channel 23 on the Pro-51 to display 888.96, a factory test frequency.
3. Press either the up or down search arrow to scan the cellular band in proper 30 KHz steps. You may temporarily store up to 10 active cellular frequencies by pressing the MONITOR key.

To permanently store cellular frequencies for scanning and to have a starting point for searching:

1. Step to the MONITOR channel you wish to permanently store, then press PROGRAM, then the desired memory channel number (including those with factory-preprogrammed test frequencies).
2. Press in sequence: PROGRAM, MONITOR, ENTER. Repeat steps 1 and 2 for each channel to be memorized.

Numerous cellular telephones also have keyboard routines, such as the one above, which turn a cellular phone into a legally purchased cellular scanner. Such phones could also conceivably scan for digital cellular signals as well as analog.

The keyboard routines for cellular phones are intended for test purposes and are often found in the phone's service

manual. An excellent source for cellular phone documentation and programming software is Nuts & Volts, a monthly publication which carries numerous ads for equipment of interest to cellular, cable and computer hackers (for subscription details call 1-800-783-4624).

## CELLULAR MONITORING TIPS & TECHNIQUES

After you find a method for scanning or searching the cellular frequencies, you may wish to employ one of several strategies to get the most from your monitoring.

The 25 MHz-wide cellular band is equally divided into two systems, systems "A" and "B." When the FCC initially issued cellular licenses, common carriers who did not provide local landline telephone service were assigned to system "A." Common carriers who provided local landline telephone service were assigned to system "B." In this area, Cellular One received the system "A" frequencies, while Bell Atlantic received the system "B" frequencies.

Each system has 416 frequency pairs available. Of the 416 channels, 21 are reserved for telemetry (control channels). That leaves 395 voice channels. In most cases, only 20 to 50 channels are normally used in each cell.

An effective and simple technique for tracking cellular activity in a specific area is to map out the cellular channels used by the nearby cells. This method works especially well in rural areas. Start by making a copy of the cellular frequency chart found in this newsletter. The base frequency appears in the first column and the paired mobile frequency (always 45 MHz less) appears in the adjacent column. The letter indicates the system (telemetry control channels are noted with a "C" suffix).

Try searching the mobile inputs, 824.04 to 848.97 and highlight the channels you monitor consistently. Another technique would be to search the outputs, 869.04 to 893.97, with the antenna removed from the scanner, or with an attenuator on the scanner's antenna line, in an effort to find nearby cell site channels. After several hours of searching you should start observing some consistency as to the channels used in your area. In urban areas, unfortunately, several cells will often come in simultaneously -- yielding less consistency in channels found in use.

The next step is to program the active channels into a bank in your scanner. The next time a significant incident occurs in your neighborhood, you'll know exactly where to tune when officials on the scene place calls to inform headquarters of the situation.

The original cellular band ran from 870 to 890. When the FCC extended the band from 869 to 894, the allocations were divided equally between the two systems. System "A," as a result, received frequencies in the 890 to 891 MHz range, in addition to those in the 869 MHz band.

Scanner listeners often search the cellular input frequencies, 824.04 to 848.97, when on the scene of a fire or police incident. Only nearby cellular users will be discovered since



the cellular phones transmit at low power levels. After finding the channel, the base, and often both sides of the conversation, will be on the output frequency (45 MHz higher). This is also a popular "close-in" technique used when someone is observed to be using a cellular phone.

For the cellular listener who has to have the best, Electronic Countermeasures of Alberta, Canada, makes what it markets as the "Cellular Surveillance Interface Test Set" for around \$400. The Cellular Surveillance Interface (CSI) decodes the digital data transmitted on cellular channels. The CSI interprets the data as cellular commands, displays the data on the PC screen and even tracks frequency changes.

The CSI reads a cell's control channel data and can tune a receiver to the specified voice channel when a cellular call is placed or received in the cell being monitored. When the call switches to a new voice channel, the receiver switches as well. In essence, the CSI turns a scanner into an extension of the phone being monitored. "No more partial calls," Electronic Countermeasures says in its brochure, "you get it all."

The CSI requires audio input from a radio's 455 KHz IF (PRO or AR radios) or clean demodulated audio (such as from an ICOM) containing the digital data from the cellular control channel (those marked with a "C" on the frequency chart). A serial output on the CSI connects to any standard nine-pin PC serial port. The output from the CSI is in plain English text, which is displayed on the PC screen.

Sample CSI screen display

#### VOICE CHANNEL

Ring Phone  
Stop Ringing  
Disconnect  
Ring Phone  
Change Power to CONTROL CHANNEL

NAC=15

555-4540 (312) Registration  
555-4540 (312) GoTo 869.880  
555-4540 (312) GoTo 869.880  
555-3238 (312) Paging  
555-0186 (312) Paging  
555-8252 (312) Paging  
555-0186 (312) GoTo 891.090  
555-0186 (312) GoTo 891.090

The ICOM R7000, R7100 and R9000; the AR-2500 and AR-3000A and the PRO-200x radios can connect directly to the CSI. The CSI will automatically change the radio frequency to follow the cellular call from one voice frequency



to another.

A demonstration version of the CSI software is available by FTP from: ftp.funet.fi pub/dx/software/msdos/rx-control/celldemo.zip. It is also available in the HamNet Forum, scanner library on Compuserve, or directly from CSI. For more details write to Bill Fischer at Electronic Countermeasures, 65 - 31 Avenue South West, Calgary, AB, Canada T2S 2Y7 or contact him on his Internet address: Bill.Fischer@T8000.CUC.AB.CA.

Edit Note: Information on monitoring cellular phones is provided for technical interest and general information. Readers are reminded that monitoring cellular phones is, whether the law is right or wrong, still against the law.

#### METRORAIL CELLULAR MONITORING

Several months ago, Bell Atlantic (AKA system "B") began providing cellular service in the Metrorail tunnels. The system, which is still under construction, operates on a limited set of frequencies. The only frequencies confirmed in use so far include: 880.11, 880.65, 880.92, 882.18, 884.70 and 885.96. The tunnel's cellular system operates at low power levels to prevent interference to above-ground cells.

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#### NEW GOVERNOR, NEW LISTENING OPPORTUNITIES?

The new year brings a new governor for Maryland and the possibility of new listening opportunities for scanner enthusiasts in Prince George's County. Parris N. Glendening, the former county executive, now turned governor, (probably) says he plans to keep his University Park home on Pine Way as his primary residence, while using the governor's mansion in Annapolis to entertain guests or for occasional overnight stays.

Former Governor William Donald Schaefer spent most of his time at the governor's mansion in Annapolis, where his staff and the assigned MSP Executive Protection Division detail communicated on 453.35 (often repeater, but primarily simplex). The Washington area Executive Protection Division repeater, at the College Park MSP barrack, operates on 453.725. Both 453.725 and 453.35 are likely candidates for use at Glendening's residence in University Park, near University of Maryland's College Park campus.

453.75 is a third Executive Protection Division frequency which is used in the Baltimore area. Besides Annapolis, a second repeater on 453.35 is at the Berlin MSP barrack to provide Ocean City coverage. The Executive Protection Division uses a CTCSS of 118.8 Hz on all three frequencies. Each of the three frequencies is used by other area governments, but with different CTCSS tones.



## DCPD CHANNEL PLAN

Since July, Prince George's County has continued to attempt to streamline the police department's channel plan. As noted in the October newsletter, a trial program is under way in which the same dispatcher dispatches the "C" and "F" sectors. Both sectors are testing channels 5 and 10, which are simulcast until the end of the trial. At the end of the trial, the county is expected to switch both sectors to one of the two channels. All CTCSS tones are 127.3 Hz, with the exception of channels 9 and 10 which use 210.7 and 192.8 Hz, respectively.



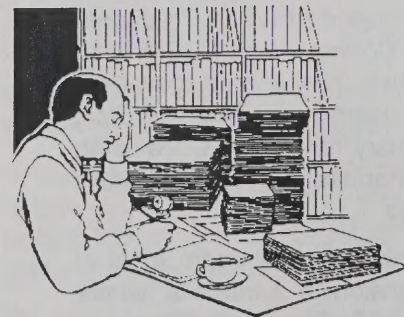
494.6875	1	Hyattsville District (A,B)
494.5375	2	Bowie District (D,E)
495.1375	3	Seat Pleasant District (G)
495.0875	4	Oxon Hill District (J,K)
494.5625	5	Beltsville (C) & Clinton (F) Dists
494.8875	6	CID, NED and SOD
494.9375	7	Tac (South Side)
494.7375	8	Tac (North Side)
494.3125	9	Seat Pleasant District (H)
495.2125	10	Simulcasts 494.5625

## ## ##

## NEWSSCAN

by Brent Baker

**BUDGET CUTS HIT DCFD.** "At the DC Fire Department repair shop, the outdoor parking lot is packed with ambulances, and on some days the sidewalks are lined with idle and broken ladder trucks the size of



tractor-trailers. Inside, pumpers are wedged in bumper to bumper as a small cadre of mechanics work round-the-clock to fix them," reads the lead of a Nov. 7 Washington Post article.

"The crowded shop is evidence of an aging fire department," wrote reporter Wendy Melillo. "The department is one of the nation's busiest, and it is assigned to protect national institutions and monuments. Yet the department must keep more of its 221-piece fleet in service longer than recommended. As the city has been confronted with a fiscal crisis, the department's share of the budget has dropped from \$102 million in 1991 to \$73 million for fiscal 1995 -- a reduction of \$37.8 million, accounting for overtime to work. The money-saving plan reduces the

inflation."

In 1991, the article noted, the department had 304 firefighters who handled 79,000 calls for service. This year, 248 firefighters will respond to an estimated 155,400 calls, fire officials told the Post. Of the department's 56 pumpers, 29 are 10 years old or older. Nine of the 22 ladder trucks are at least 15 years old; four reserve trucks are more than 20 years old. National Fire Protection Association guidelines, Melillo noted, recommend that fire departments replace pumpers every 10 years and ladder trucks every 15. For the District, that would mean purchasing at least four pumpers and one ladder truck each year.

Former Emergency Medical Services director Robert R. Bass told the Post that street bumps, frequent starts and stops and 150,000 calls a year contribute to ambulances breaking down, which he said require replacement after only three years of service. "The high volume of calls is attributed to the District's violent crime rate, with more than 400 homicides and 2,000 nonfatal shootings annually," Melillo observed.

According to the Post: "Thomas N. Tippet, president of Local 36 of the International Association of Fire Fighters, attributed the poor state of equipment to a decision in 1990 to dispatch fire trucks as the first response to medical calls. The department initiated the practice because all the on-duty ambulances often were busy at the same time. But medical runs have cut in half the life expectancy of pumpers and ladder trucks, Tippet said. 'What is destroying the equipment is this crazy response system,' he said."

"Although some other fire departments typically send fire trucks on medical calls, what sets the District apart is its high number of emergency calls. The District has the nation's sixth-busiest fire department, after New York, Los Angeles, Dallas, Philadelphia and Baltimore." In a survey of 300 fire departments nationwide, published in June's Firehouse magazine, the District had the busiest fire station, the busiest basic life-support ambulance and the busiest pumper.

Fire Station 30, at 49th Street and Central Avenue NE, which has a pumper, ladder truck, medic unit and ambulance, made 25,921 runs last year, according to the survey. Ambulance 16, at 1520 C St. SE, was called out 7,958 times, and Engine Company 10, at 1342 Florida Ave. NE, responded to 8,013 calls.

**DCFD USES DAILY CLOSURES TO SAVE MONEY.** The DC Fire Department during the last week of November began closing four fire companies (a company being an engine or truck or rescue squad) each day as a way to avoid overtime payments to firefighters. Fire officials told the Washington Post and Washington Times that because each company is required by law to have a certain number on staff each day, many firefighters are paid



number of engines on duty each day from 32 to 30, though one official said more cuts are possible. The Post says the changes, which took effect Nov. 27, will continue until Feb. 4. They are expected to save about \$ 2.1 million.

For every four fire department employees who call in sick or cannot make it to work on a given day, one company will be shut down, with a maximum of four companies closed on a single day.

DC FIRE DISPATCHERS PROTEST CUTS. In early October, DCFD dispatchers marched outside the John Wilson building to protest cuts in staffing. Since July 1, the Washington Post reported, the DC Fire Department's Communications Division has been cut from 52 to 44, leaving 11 people instead of 13 working on any one shift." The staff cuts were to end on Oct. 1, but continue. Of the 11 people working each shift, one dispatcher noted, five worked solely with radios linked with ambulances and fire trucks, leaving the rest to answer three ambulance lines, a police direct line and a switchboard.

TEN MORE DC POLICE STATIONS? Police Chief Fred Thomas wants to bring a precinct system back to the District by adding 10 new stations, bringing the total to 17. As part of an effort to focus the department's resources on "community policing," it would return the department to the deployment system used in the 1960s with more foot beats and stations closer to communities.

Thomas believes the administrative structure already exists to implement his plan, the Washington Times reported. Each of the seven patrol districts are currently divided into three sectors. Thomas said the number of police district stations could match the 21 sectors. To create the stations, the city "would renovate nearly vacant government office buildings and 11 mothballed schools..." If approved by the city

council, and not rescinded by a new chief appointed by the new mayor, the expanded number of stations could be in place by next fall.

LEESBURG FIRE SIRENS CREATE CONTROVERSY. In this age of instant communication, the one-minute fire sirens used to alert Leesburg's volunteer firefighters has many residents and business people upset. As growth engulfs Loudoun County and Leesburg, says the Nov. 29 Washington Post, "the volume of emergency calls has dramatically increased -- from a few hundred a year several years ago to a projected 1,200 in 1994. Commercial and residential developments have crept close to the town's two sirens. As a result, many residents of this town of 19,500 view the klaxon as more of a public nuisance than a charming anachronism."

"Fire sirens have long been as common as dirt roads and country stores in rural areas nationwide," says reporter Rajiv Chandrasekaran. "But as wireless technology has become cheaper and public complaints louder, many departments are abandoning their old-time noisemakers for pagers, cellular phones and high-frequency two-way radios."

"In Leesburg," the article stated, "fire department officials say they can't do away with the sirens. Even though many firefighters carry pagers or radios, the equipment works in only 80 percent of the county, said William Goldfeder, director of Loudoun's fire and rescue services. The other areas are 'dead pockets,' where sirens are the only means of communication, he said. And not all firefighters have the special-issue radio pagers, which volunteers must buy themselves at a cost of \$400."

Goldfeder, the Post reported, asked the county's Board of Supervisors two weeks ago for \$500,000 to purchase pagers for every volunteer and to improve the department's communication system from the 1950s-era technology in use now to a modern radio system that would be able to reach every part of the county. But even if his request is granted, Goldfeder said he will recommend that the sirens remain.

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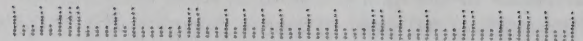


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4 Issues Remaining

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Please address all correspondence to Alan. We encourage readers to submit material and to write articles which relate to the hobby. All submissions are subject to editing for both style and content. When submitting material please make certain we have your phone number should we have any questions. We welcome frequency and visitor requests, but please include a SASE.

**Meeting Coordinators:**

Mike Peyton, Maryland Coordinator (703-902-6241)  
Ken Fowler, Virginia Coordinator (703-385-2165)

**Frequency Forum Computer Bulletin Board:**

We encourage computer users to log onto Jack Anderson's Frequency Forum computer BBS at 703-207-9622 (8-N-1). Frequency Forum is the official electronic gathering place for readers of the Capitol Hill Monitor!

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